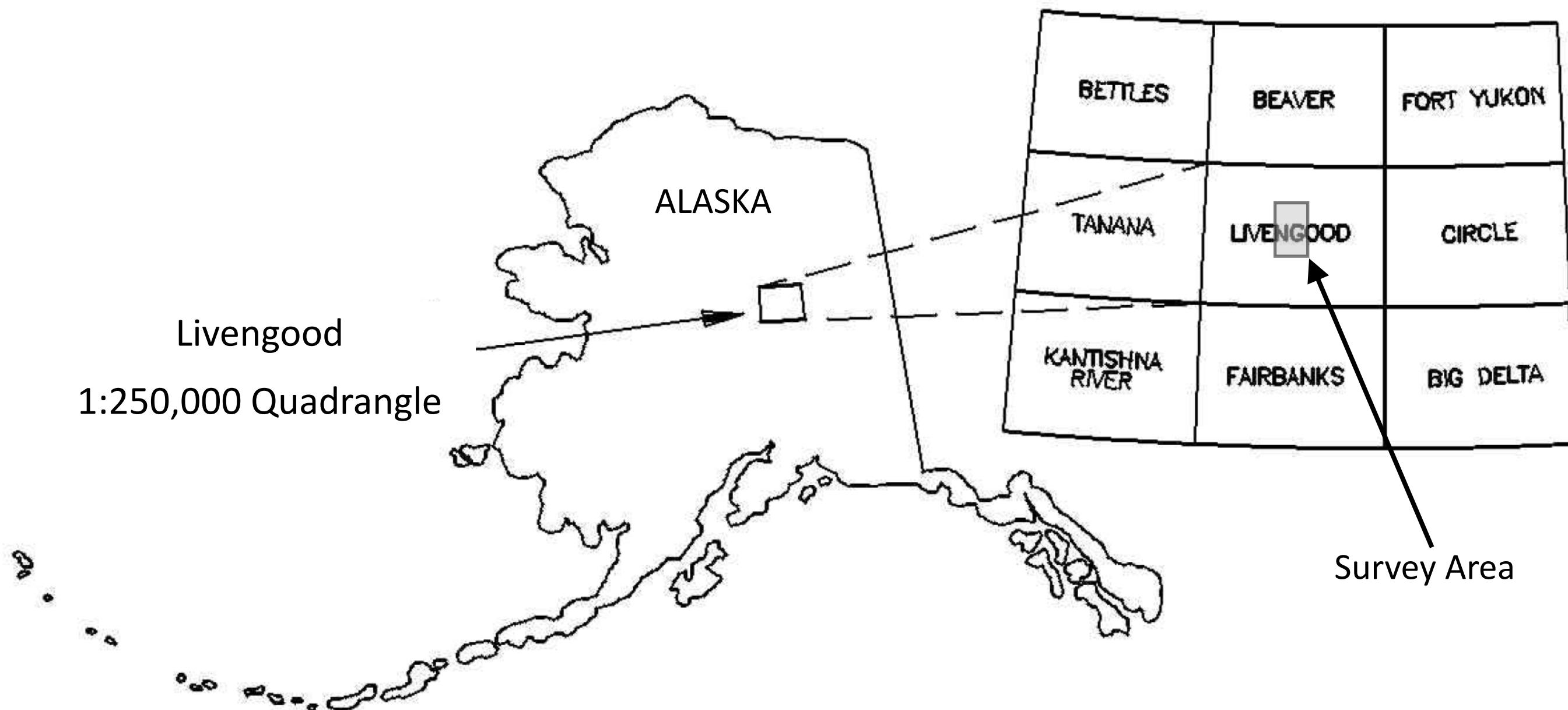


# Livengood Electromagnetic and Magnetic Airborne Geophysical Survey Data Compilation

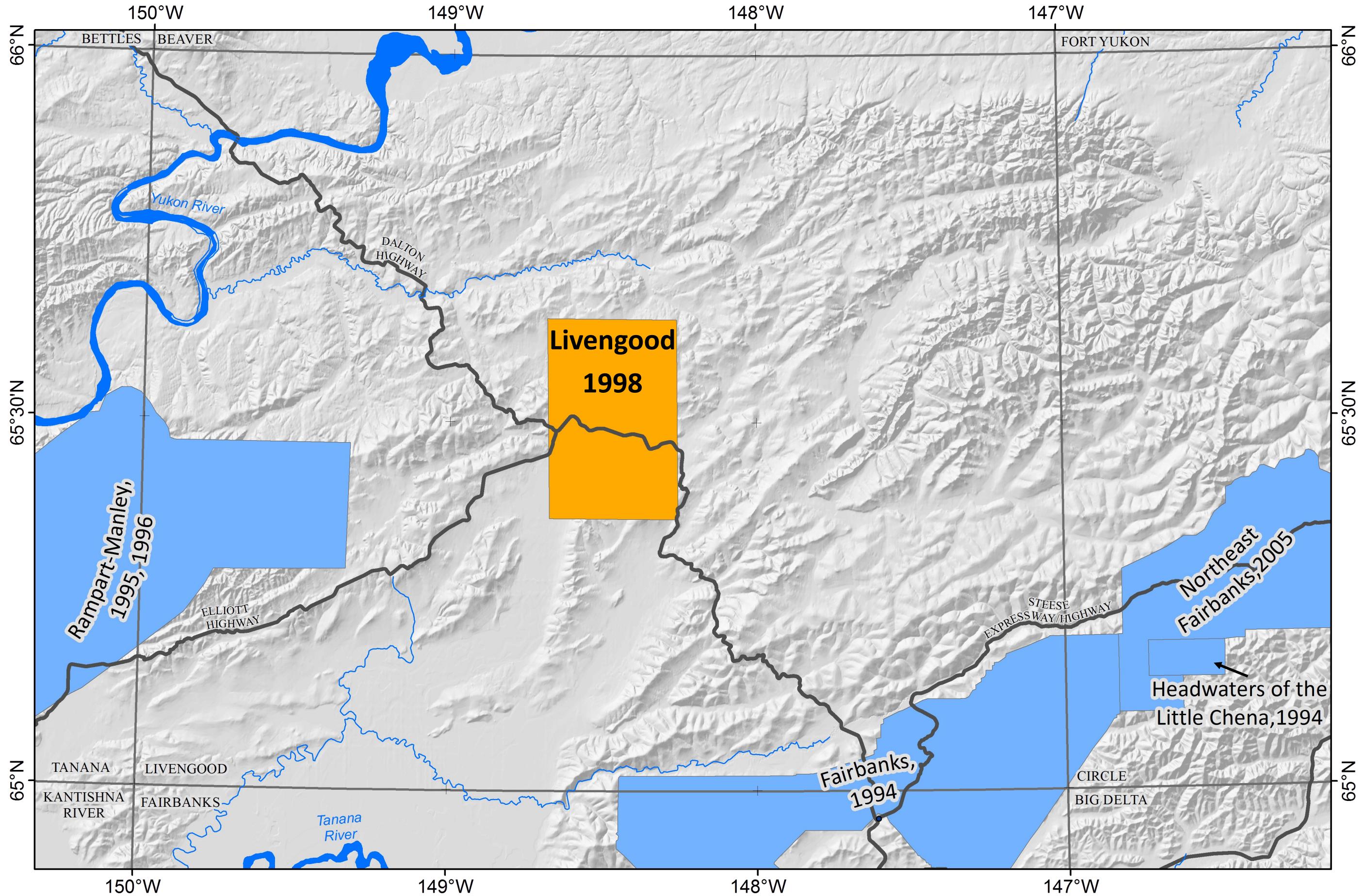
State of Alaska, Department of Natural Resources, Division of Geological & Geophysical Surveys

<http://dx.doi.org/10.14509/29412>

## Survey Overview



Livengood survey area, nearby DGGS 400m electromagnetic and magnetic surveys, relevant 1:250,000 USGS quadrangle boundaries, major highways, major rivers, and shaded relief.



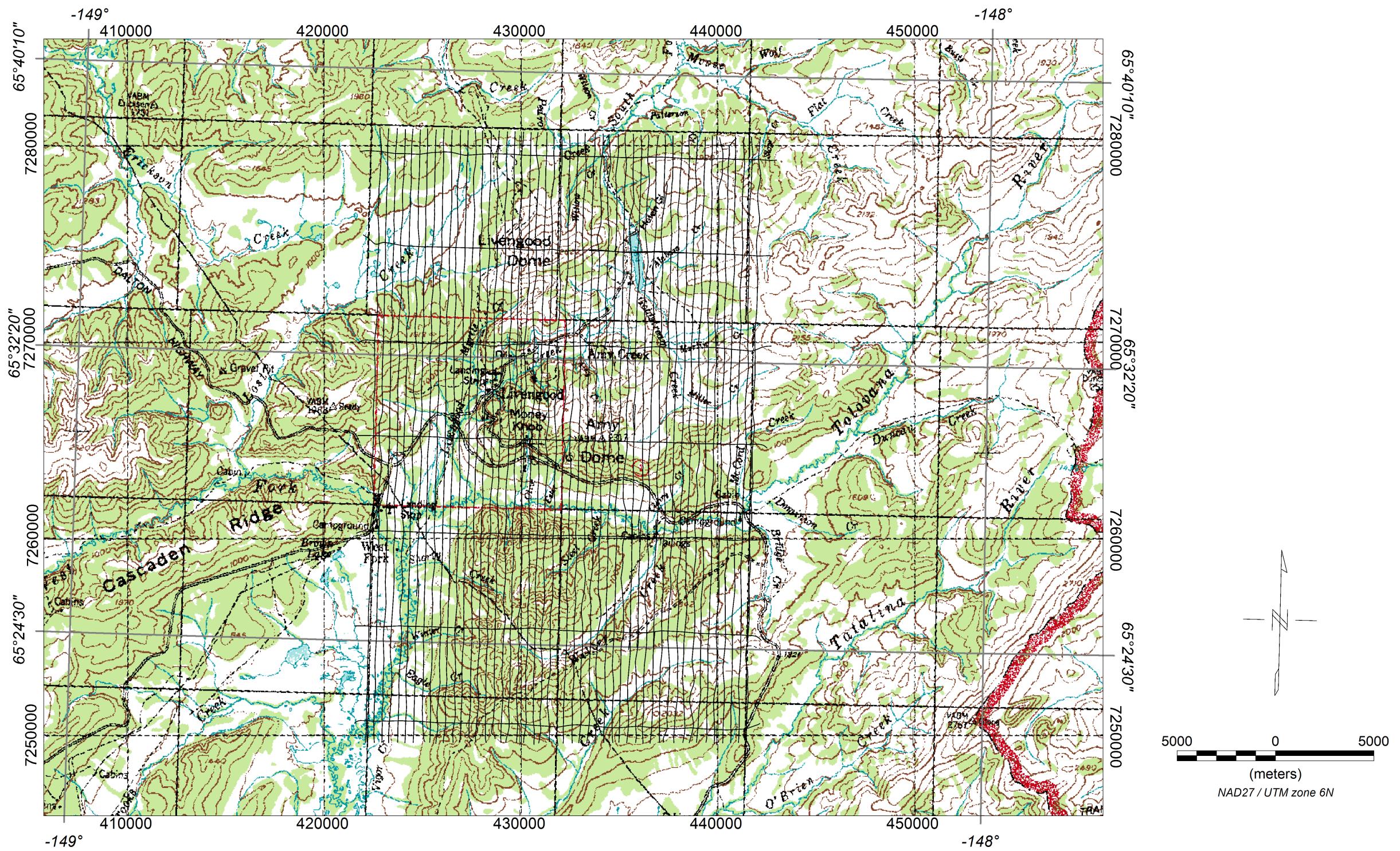
# Flight Lines and Topography

**Data Types:** Frequency Domain Electromagnetic and Magnetic

**System:** DIGHEM<sup>V</sup>

**Frequencies:** coaxial 1000 and 5500 Hz; coplanar 900 Hz, 7200 Hz and 56000 Hz

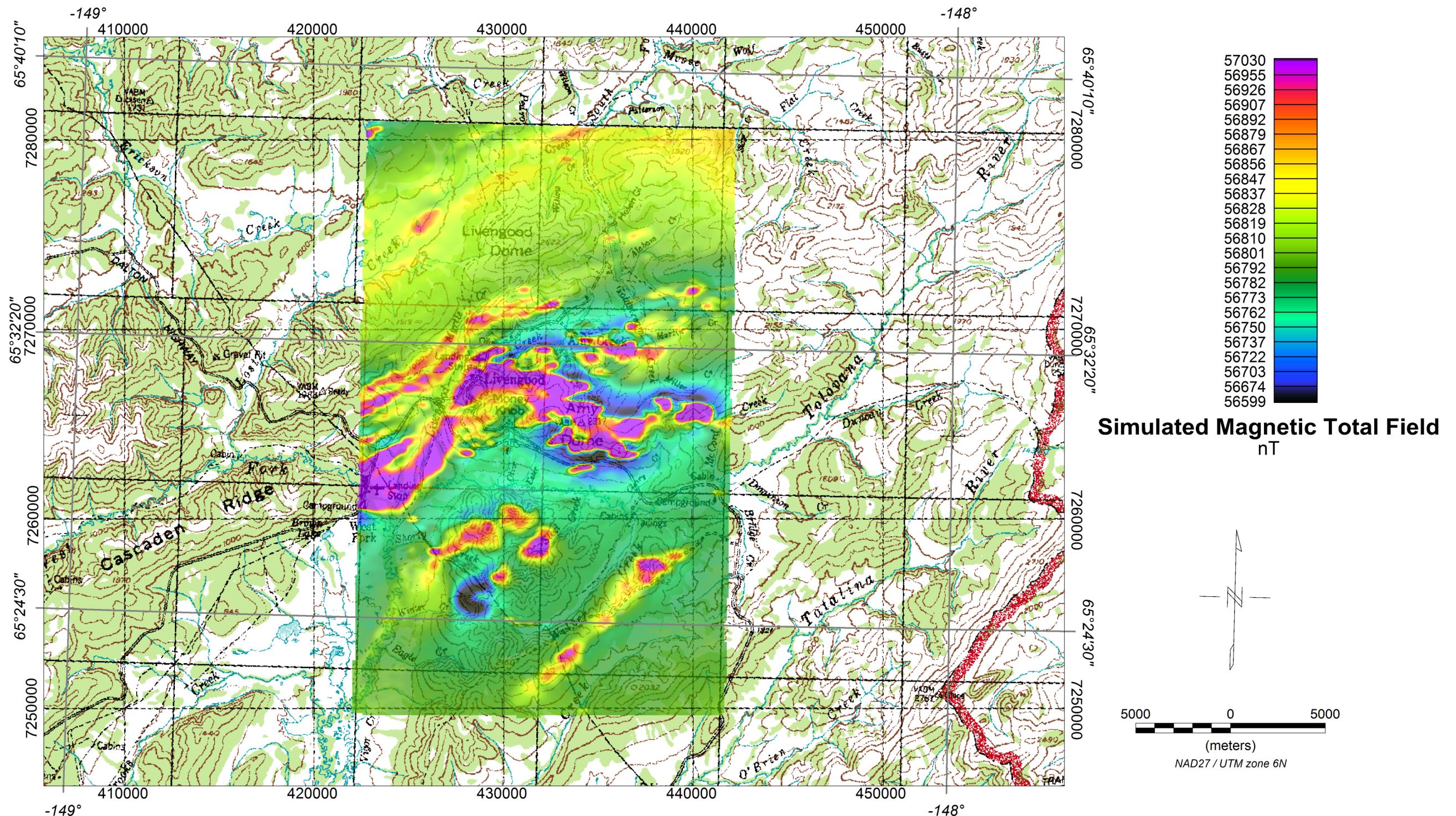
**Line spacing:** 400 meters



# Simulated Magnetic Total Field

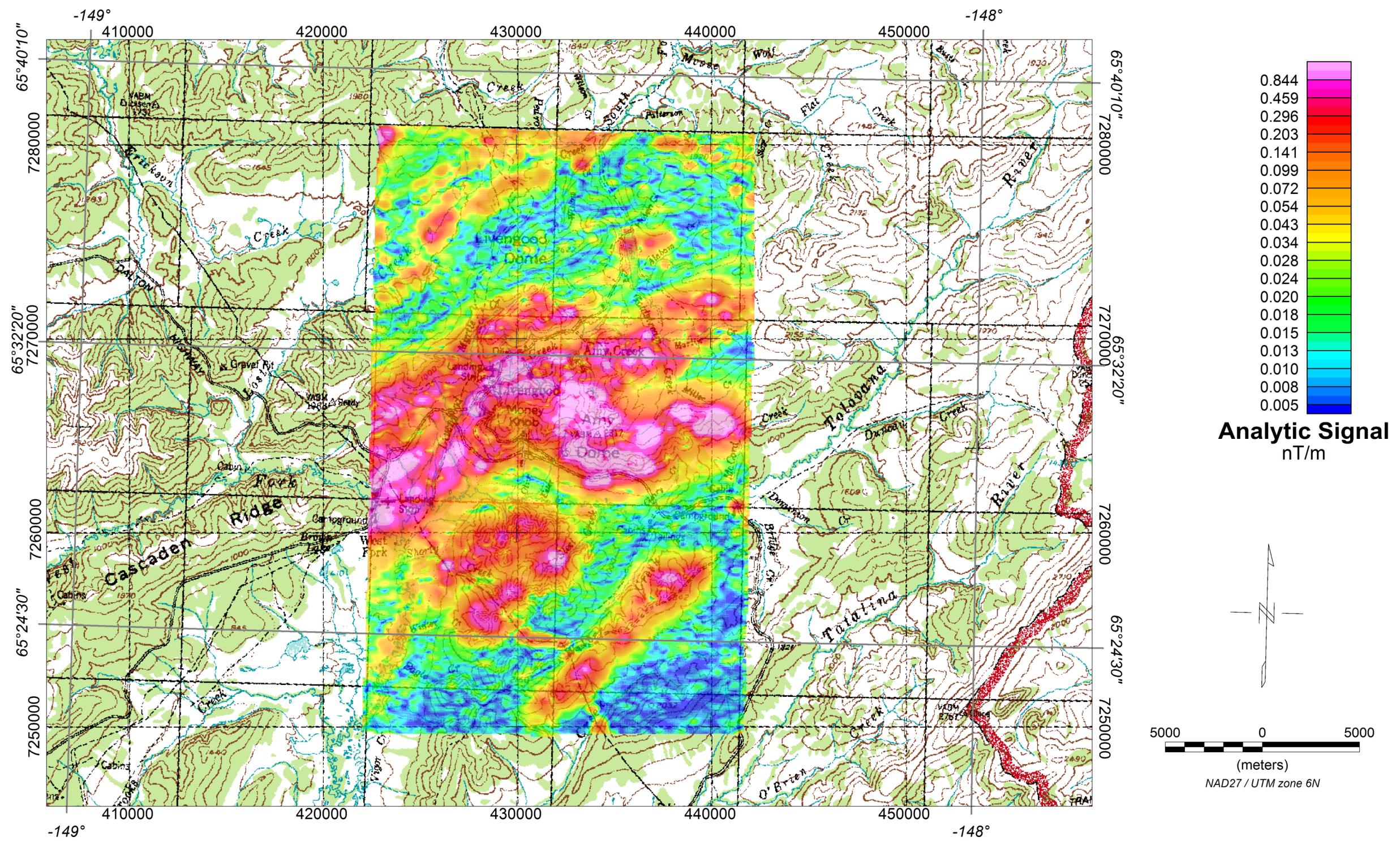
The magnetic total field data were processed using digitally recorded data. Data were collected at a sampling interval of 0.1 seconds. The magnetic data were corrected for diurnal variations by subtracting the digitally recorded base station magnetic data, IGRF corrected (IGRF model 1995, updated for September 1998), leveled to the tie line data, the average IGRF value was added back to the data, and (4) interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: *Journal of the Association of Computing Machinery*, v. 17, no. 4, p. 589–602.



# Analytic Signal

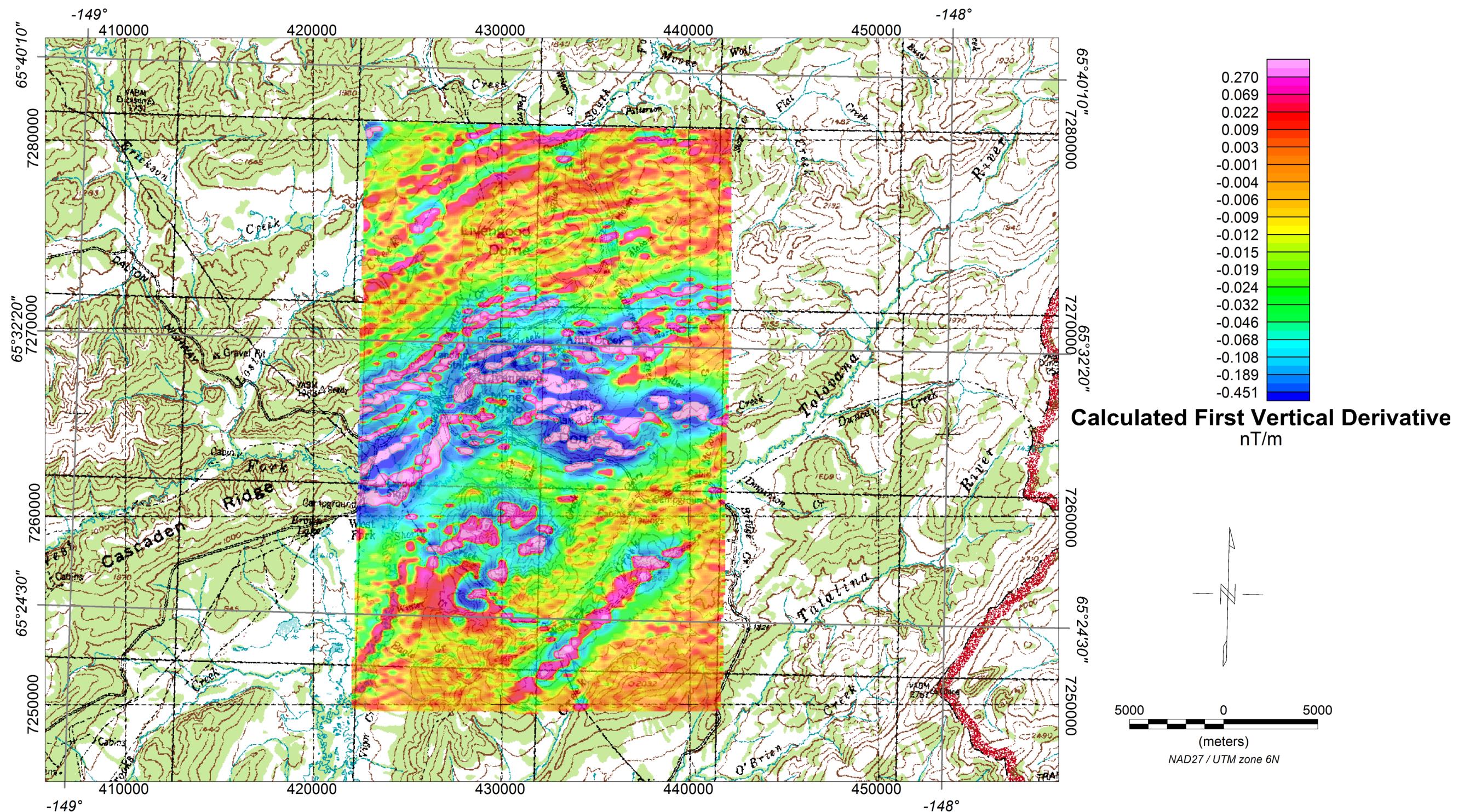
Analytic signal is the total amplitude of all directions of magnetic gradient calculated from the sum of the squares of the three orthogonal gradients. Mapped highs in the calculated analytic signal of magnetic parameter locate the anomalous source body edges and corners (such as contacts, fault/shear zones, etc.). Analytic signal maxima are located directly over faults and contacts, regardless of structural dip, and independent of the direction of the induced and/or remanent magnetizations.



# First Vertical Derivative of the Magnetic Field

The first vertical derivative grid was calculated from the processed total magnetic field grid using an FFT base frequency domain filtering algorithm. The resulting first vertical derivative grid provides better definition and resolution of near-surface magnetic units and helps to identify weak magnetic features that may not be evident on the total field data.

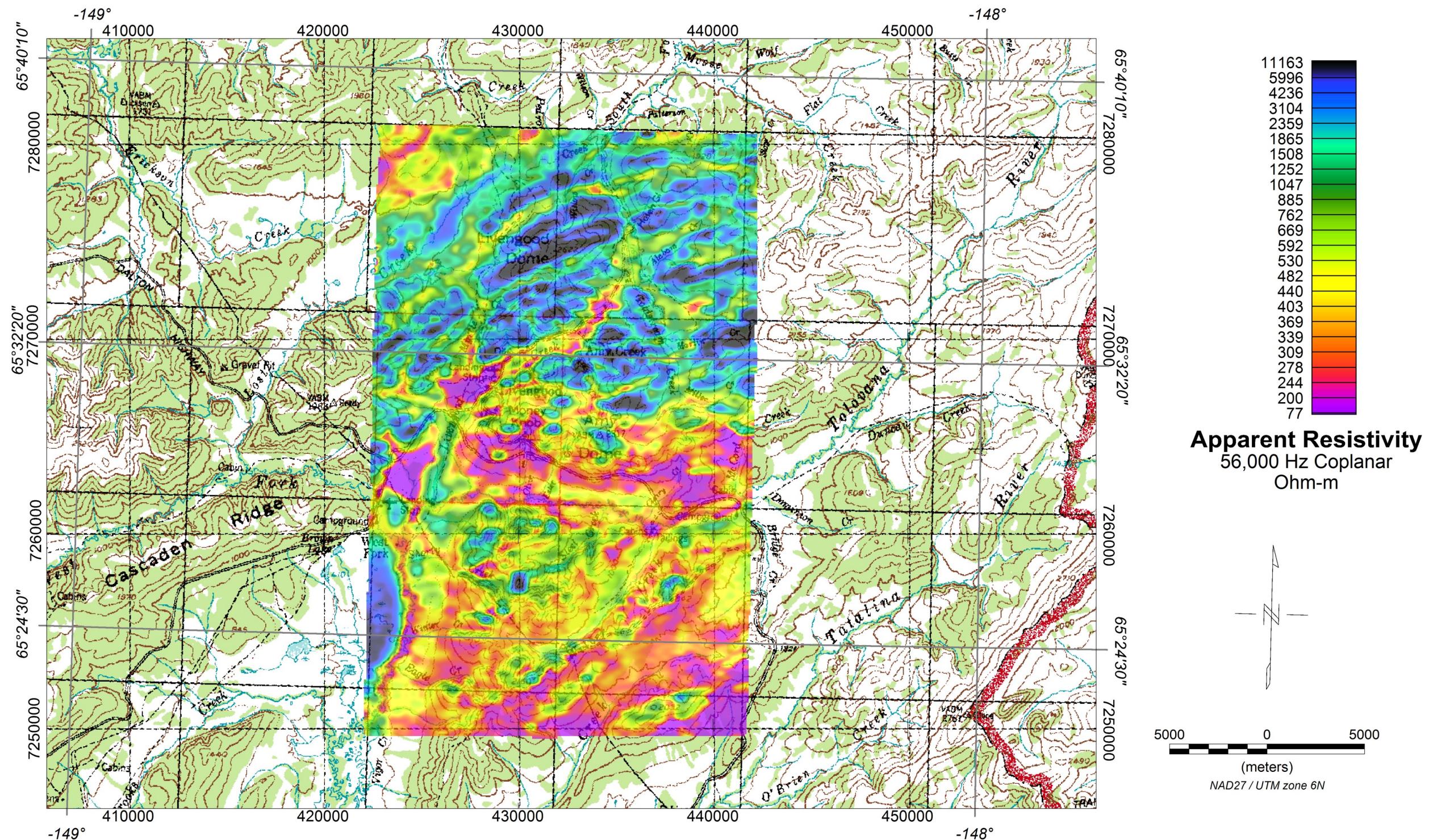
Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589–602.



# Resistivity 56,000 Hz Coplanar

DIGHEM EM system measured in-phase and quadrature components at five frequencies. Two vertical coaxial coil pairs operated at 1,000 and 5,500 Hz while three horizontal coplanar coil pairs operated at 900, 7,200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature component of the coplanar 56,000 Hz measurement using the pseudo-layer half-space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids in this publication.

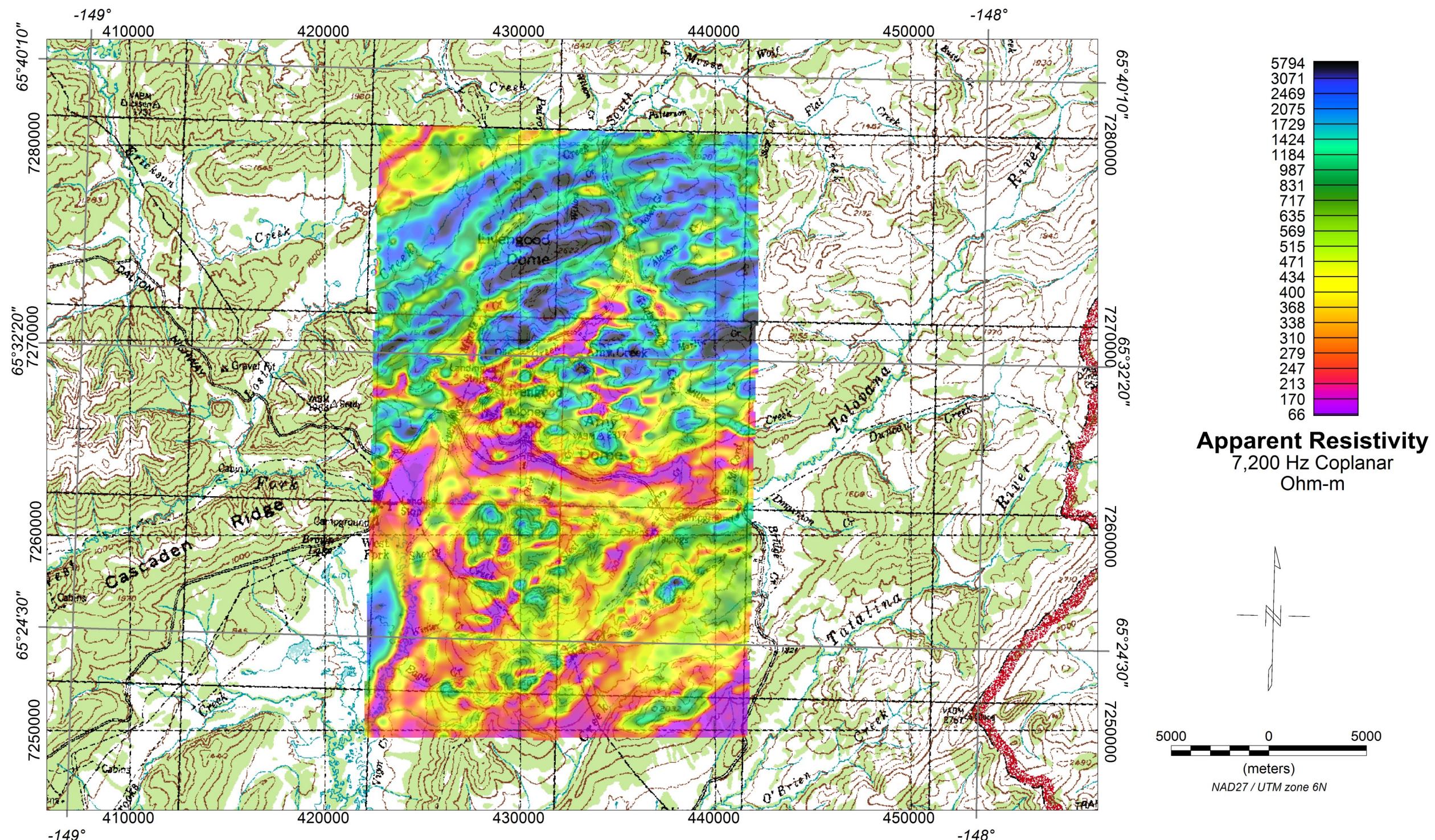
Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589–602.



# Resistivity 7,200 Hz Coplanar

DIGHEM EM system measured in-phase and quadrature components at five frequencies. Two vertical coaxial coil pairs operated at 1,000 and 5,500 Hz while three horizontal coplanar coil pairs operated at 900, 7,200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature component of the coplanar 7,200 Hz measurement using the pseudo-layer half-space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: Journal of the Association of Computing Machinery, v. 17, no. 4, p. 589–602.



## **Resistivity 900 Hz Coplanar**

DIGHEM EM system measured in-phase and quadrature components at five frequencies. Two vertical coaxial coil pairs operated at 1,000 and 5,500 Hz while three horizontal coplanar coil pairs operated at 900, 7,200 and 56,000 Hz. EM data were sampled at 0.1 second intervals. The EM system responds to bedrock conductors, conductive overburden, and cultural sources. Apparent resistivity is generated from the in-phase and quadrature component of the coplanar 900 Hz measurement using the pseudo-layer half-space model. The data were interpolated onto a regular 80 m grid using a modified Akima (1970) technique. All grids were then resampled from the 80 m cell size down to a 25 m cell size to produce the maps and final grids in this publication.

Akima, H., 1970, A new method of interpolation and smooth curve fitting based on local procedures: *Journal of the Association of Computing Machinery*, v. 17, no. 4, p. 589–602.

